**Genetics Revision Name:**

1. The following pedigrees show the patterns of inheritance of a deadly recessive disease. Determine the genotype of each family member.

a. b.

II

I

III

I

II

III

I 1 = I 2 = I 1 = I 2 =

II 1 = II 2 = II 3 = II 1 = II 2 = II 3 =

II 4 = II 5 = II 4 =

III 1 = III 2 = III 3 = III 1 = III 2 = III 3 =

III 4 = III 4 =

1. Use the following experiment results to determine which trait is dominant and which are recessive.

|  |  |  |
| --- | --- | --- |
| **Trait** | **Results** | **Dominant (D) or Recessive (R)** |
| Seed colour | Grey = 705, White = 224 | Grey = White = |
| Seed shape | Wrinkled = 180, Round = 400 | Wrinkled = Round = |
| Pod colour | Green = 450, Yellow = 150 | Green = Yellow = |

1. Determine the genotype, phenotype and the proportion of each offspring for each of the following.
2. R = red, W = white, RW = red and white b. R = red, r = white

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | R | W   |  |  |  | | --- | --- | --- | |  | R | r | | r |  |  | | r |  |  | |
| R |  |  |
| W |  |  |

**%** red = **Fraction** red =

**%** white = **Fraction** white =

**%** red and white =

c. CY = Yellow, CW = white, CY CW = cream d. R = red, r = white

|  |  |  |
| --- | --- | --- |
|  | CY | CW |
| CW |  |  |
| CW |  |  |

|  |  |  |
| --- | --- | --- |
|  | r | r |
| R |  |  |
| R |  |  |

Ratio of CWCW : CYCW : CYCY % red = % white =

= : :

1. For each of the pedigrees above, state whether complete dominance, incomplete dominance or co-dominance is shown.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Use the following information to complete Punnett squares and analyse the percentages of each offspring.
2. A homozygous dominant male plant is b. A heterozygous male plant is crossed

crossed with a homozygous recessive female plant. with a heterozygous female plant.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

% = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ % = \_\_\_\_\_\_\_\_ % = \_\_\_\_\_\_\_\_ % = \_\_\_\_\_\_\_\_

1. Match the following terms with their definitions:

|  |  |
| --- | --- |
| 1. DNA | 1. Different gene types |
| 1. Homozygous | 1. Containing half the number of chromosomes, such as in sex cells |
| 1. Codominance | 1. Sex cells such as sperm in males or ova in females |
| 1. Recessive | 1. Body cells that reproduce by mitosis to produce identical daughter cells |
| 1. Meiosis | 1. The process of producing sex cells |
| 1. Somatic cells | 1. Gene that is not dominant or expressed unless homozygous |
| 1. Gametes | 1. Genes that are equally dominant |
| 1. Haploid | 1. Having alleles that are identical |
| 1. Allele | iv. Chemical that codes for different proteins/hormones to determine body traits |

A = \_\_\_\_\_ B = \_\_\_\_\_ C = \_\_\_\_\_ D = \_\_\_\_\_ E = \_\_\_\_\_ F = \_\_\_\_\_ G = \_\_\_\_\_ H = \_\_\_\_\_ I = \_\_\_\_\_

1. Provide the complimentary base pairing for the following DNA sequences:
2. A G C T G G T = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. G C C G T A = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Complete the following sentences by circling the correct answer.
4. Gametes undergo (mitosis/meiosis) and the daughter cells are (diploid/haploid) and (identical/similar).
5. Somatic cells undergo (mitosis/meiosis) and the daughter cells are (diploid/haploid) and (identical/similar).
6. If all the chromosomes in an animal are homozygous they are (identical/different) and the animal will be (pure bred/hybrid)
7. If all the chromosomes in an animal are heterozygous they are (identical/different) and the animal will be pure bred/hybrid)
8. If a person has a recessive genetic disease, they inherited (0 / 1 / 2) of the allele for the disease from each parent.
9. Males have (22 / 23) pairs of autosomal chromosomes and (XX / XY) sex chromosomes.
10. Females have (22 / 23) pairs of autosomal chromosomes and (XX / XY) sex chromosomes.

**Answers:** 1a) I1 = Nn, I2 = Nn, II1 = nn, II2 = Nn, II3 = nn, II4 = Nn, II5 = Nn, III1 = nn, III2 = Nn, III3 = nn, III4 = Nn or NN. 1b) I1= Nn, I2 = Nn, II1 = Nn, II2 = Nn, II3 = Nn, II4 = Nn, III1 = nn, III2 = Nn or NN, III3 = nn, III4 = nn. 2. Grey = D White = R, Wrinkled = R Round = D, Green = D Wrinkled = R. 3a) 25% red, 25% white, 50% red and white 3b) ½ red, ½ white 3c) 2:1:0 3d) 100% red, 0% white 4a) codominance 4b) complete dominance 4c) incomplete dominance 4d) complete dominance 5a) 100% heterozygous (e.g. Hh) 5b) 25% homozygous dominant (e.g. HH), 50% heterozygous (e.g. Hh), 25% homozygous recessive (e.g. hh) 6) A = iv, B = viii, C = vii, D = vi, E = V, F = iv, G = iii, H = ii, I = I 7a) TCGACCA 7b) CGGCAT 8a) meiosis, haploid, similar 8b) mitosis, diploid, identical 8c) identical, pure bred 8d) different, hybrid 8e) 1 8f) 22, XY 8g) 22, XX.